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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/619,395	07/15/2003	Kerstin Hell	S12425-2091	7676

7590

03/17/2005

FROMMER LAWRENCE & HAUG LLP
745 Fifth Avenue
New York, NY 10151

EXAMINER

PENG, KUO LIANG

ART UNIT	PAPER NUMBER
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1712

DATE MAILED: 03/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

10/619,395

Applicant(s)

HELL ET AL.

Examiner

Kuo-Liang Peng

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 12-16, 19 and 20 is/are rejected.
- 7) ☒ Claim(s) 10, 11, 17 and 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

1. The Applicants' amendment filed on January 25, 2005 was received. Claims 16-20 are added. Now, Claims 1-20 are pending. The following Office action is made non-final because new references are cited.

2. Applicant is advised that should Claim 10 be found allowable, Claim 17 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

3. The text of those sections of Title 35, U.S. code not included in this action can be found in a prior Office Action (Paper No. 1004).

Claim Objections

4. Claim 18 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

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Note that the imidazolium ions in Claim 11 already have been substituted in the 2-position.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 19 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 19 recites the limitation "imidazolium ion" in line 1. There is insufficient antecedent basis for this limitation in the claim.

In Claim 20 (line 1), "a cation" causes confusion because Claim 13 recites the use of a mixture of two or more cations.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject

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matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-9, 12-16 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murphy (WO 00/32572) in view of Hardman (Silicones, Reprinted from Encyclopedia of Polymer Science and Engineering, vol. 15, 2nd Ed., pages 254-258, 298 and 230) as evidenced by Meals (Pure Appl. Chem. 13, 141 (1966)), and Sheldon ("Catalytic reactions in ionic liquids", Chem. Commun., pp. 2399-2407, 1996), alternatively Vaultier (Symposia Papers Presented Before the Division of Environmental Chemistry, American Chemical Society, San Diego, CA, 41(1), 398-400, April 1-5, 2001, "Transition metal catalyzed hydroboration and hydrosilylation of acetylenes in ionic liquids")

Murphy discloses a process of hydrosilylation in the presence of an ionic liquid. (page 5, lines 1-15, page 10, line 1 to page 15, line 10, page 18, line 7 to page 19, line 10 and Claims) (page 18, lines 1-6) Murphy is silent on the specific use of a SiH-containing polysiloxane for hydrosilylation. However, Hardman in Encyclopedia of Polymer Science and Engineering teaches that a hydrosilylation is well known to be an "addition of Si-H across any unsaturated species" and "The reaction has been extensively employed for the synthesis of organofunctional

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silanes and siloxanes ([references]19,67,71)". Furthermore, Meals, the aforementioned reference labeled as "71" cited in Hardman clearly teaches that the siloxanes can be SiH-containing polysiloxane. (Table 1) Therefore, it would have been obvious to one of ordinary skill in the art to apply Murphy's hydrosilylation process for the hydrosilylation reaction between a SiH-containing polysiloxane and a compound having C-C multiple bonds with expected success. Furthermore, Murphy teaches the process comprising a step of chemical separations. Murphy is silent on a specific step of separating the ionic liquid with the dissolved catalyst from the reaction mixture and recycling the ionic liquid with the dissolved catalyst. However, Sheldon teaches that it is desirable to efficiently recycle the ionic liquid with the dissolved catalyst in order to minimize chemical wastes. (page 2399, 1st paragraph) Alternatively, Vaultier teaches of recycling the catalyst in an ionic liquid. (page 398) In light of which, it would have been obvious to one of ordinary skill in the art at the time of invention to incorporate a chemical separation step of Sheldon's or Vaultier's recycling the ionic liquid with the dissolved catalyst. Murphy further teaches the use of an ionic liquid wherein the counter anion can be a sulfate, tetrafluoroborate, etc. (col. 12, lines 5-18) The amount of the ionic liquid used is obviously illustrated in Examples. For Claims 12 and 19, Murphy teaches an ionic liquid of A^+B^- wherein A^+ can be a pyridinium cation and B^- can be

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tetrafluoroborate. Tetrafluoroborate is one of few anions mentioned specifically for heterogeneous application. (page 11, 2nd paragraph and page 12, 2nd paragraph) For Claims 13 and 20, Murphy discloses various cations. (page 10, line 9 to page 12, line 4). Because all of these cations are suitable for ionic liquids to be used in catalyst systems, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to utilize more than one cations in the ionic liquids with expected success. See MPEP 2144.06.

Applicant's arguments have been fully considered but they are not persuasive. The focus argument related to the core patentability is discussed below.

For Applicants' argument in Remarks, page 12, 2nd paragraph, note that as mentioned above, Murphy does teach the use of ionic liquid in a hydrosilylation reaction. Although Murphy illustrates the use of ionic liquid in the polymerization of isobutylene in Examples, this is merely a preferred embodiment. Murphy certainly does not teach away the use of the ionic liquid in hydrosilylation reactions. See MPEP 2123. Furthermore, as mentioned above, in view of the aforementioned Encyclopedia and Meals, one of ordinary skill in the art would know that hydrosilylation has been extensively employed for the synthesis of organofunctional polysiloxanes.

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For Applicants' argument in Remarks, page 12, 3rd paragraph, page 13, whole page, as Applicants admit that Sheldon is really a review of the state of art regarding catalytic reactions in ionic liquids at the time of its publication. Thus, in view of Sheldon's teaching, one of ordinary skill in the art would readily recognize the advantages of the catalyst system in the presence of an ionic liquid, i.e., efficient recycling of the catalyst, minimizing waste, economically attractive, etc. In addition, Vaultier is one of references in the state of art that teach the advantages of the catalyst system in the presence of an ionic liquid for hydrosilylation. Especially, note that Vaultier is in the same field as Murphy's endeavor, i.e., hydrosilylation.

For Applicants' argument in Remarks, page 14, whole page, to page 15, 2nd paragraph, note that there is no pick and choose in combining the aforementioned references. Applicants should notice that "One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., Inc., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986)." See MPEP 2145 (IV). Thus, although Murphy is silent on the recycling the catalyst system, one of skill in the art would have been motivated to recycle Murphy's catalyst system in view of all the advantages of the recycling process Sheldon or Vaultier teaches.

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Especially, the hydrosilylation typically involves the use of costly precious metals such as Platinum, etc., and the potential pollution results from improper disposal of the ionic liquid.

9. Claims 1-9, 12-16 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vaultier in view of Hardman as evidenced by Meals.

For Claims 1-9, Vaultier discloses a process of hydrosilylation between a hydridosilane and a compound containing C-C multiple bonds utilizing a catalyst system comprising an ionic liquid having cations such as N-alkylpyridinium and N,N'-dialkylimidazolium and anions such as BF_4^- , etc. The catalyst system is recycled. (page 398-399) Vaultier is silent on the specific use of Si-H containing polysiloxane. However, Hardman in Encyclopedia of Polymer Science and Engineering teaches that a hydrosilylation is well known to be an "addition of Si-H across any unsaturated species" and "The reaction has been extensively employed for the synthesis of organofunctional silanes and siloxanes ([references]19,67,71)". Furthermore, Meals, the aforementioned reference labeled as "71" cited in Hardman clearly teaches that the siloxanes can be SiH-containing polysiloxane. (Table 1) Note that although Vaultier's hydridosilane and Meals' Si-H containing polysiloxane may not be true homologs or isomers, these two compounds do

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posses the identical reactive sites, i.e., Si-H toward hydrosilylation. Thus, the substitution of hydridosilane with Si-H containing polysiloxane would have been obvious because the court held, "Prior art structures do not have to be true homologs or isomers to render structurally similar compounds *prima facie* obvious. In *re Payne*, 606 F.2d 303, 203 USPQ 245 (CCPA 1979) (Claimed and prior art compounds were both directed to heterocyclic carbamoyloximino compounds having pesticidal activity. The only structural difference between the claimed and prior art compounds was that the ring structures of the claimed compounds had two carbon atoms between two sulfur atoms whereas the prior art ring structures had either one or three carbon atoms between two sulfur atoms. The court held that although the prior art compounds were not true homologs or isomers of the claimed compounds, the similarity between the chemical structures and properties is sufficiently close that one of ordinary skill in the art would have been motivated to make the claimed compounds in searching for new pesticides.). See also In *re Mayne*, 104 F.3d 1339, 41 USPQ2d 1451 (Fed. Cir. 1997) (claimed protein was held to be obvious in light of structural similarities to the prior art, including known structural similarity of Ile and Lev); In *re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986) (claimed and prior art compounds used in a method of treating depression would have been expected to have similar activity

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because the structural difference between the compounds involved a known bioisosteric replacement) (see MPEP § 2144.08, paragraph II.A.4(c) for a more detailed discussion of the facts in the Mayne and Merck cases); In re Dillon, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir.1991) (The tri-orthoester fuel compositions of the prior art and the claimed tetra-orthoester fuel compositions would have been expected to have similar properties based on close structural and chemical similarity between the orthoesters and the fact that both the prior art and applicant used the orthoesters as fuel additives.) (See MPEP § 2144 for a more detailed discussion of the facts in the Dillon case.). Compare In re Grabiak, 769 F.2d 729, 226 USPQ 871 (Fed. Cir. 1985) (substitution of a thioester group for an ester group in an herbicidal safener compound was not suggested by the prior art); In re Bell, 991 F.2d 781, 26 USPQ2d 1529 (Fed. Cir. 1993) (The established relationship between a nucleic acid and the protein it en-codes in the genetic code does not render a gene prima facie obvious over its corresponding protein in the same way that closely related structures in chemistry may create a prima facie case because there are a vast number of nucleotide sequences that might encode for a specific protein as a result of degeneracy in the genetic code (i.e., the fact that most amino acids are specified by more than one nucleotide sequence or codon).); In re Deuel, 51 F.3d 1552, 1558-59, 34 USPQ2d 1210, 1215 (Fed. Cir. 1995) ("A prior art

disclosure of the amino acid sequence of a protein does not necessarily render particular DNA molecules encoding the protein obvious because the redundancy of the genetic code permits one to hypothesize an enormous number of DNA sequences coding for the protein." The existence of a general method of gene cloning in the prior art is not sufficient, without more, to render obvious a particular cDNA molecule.).” See MPEP 2144.09. Therefore, it would have been obvious to one of ordinary skill in the art to apply Murphy’s hydrosilylation process for the hydrosilylation reaction between a SiH-containing polysiloxane and a compound having C-C multiple bonds with expected success. For Claims 12 and 19, as mentioned above, the ionic liquid can be N,N’-dialkylimidazolium tetrafluoroborate. For Claims 13 and 20, Vaultier discloses N-alkylpyridinium and N,N’-dialkylimidazolium as cations. (page 398) Because all of these cations are suitable for ionic liquids to be used in catalyst systems, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to utilize more than one cations in the ionic liquids with expected success. See MPEP 2144.06. For Claims 14-16, Vaultier is silent on the specific amount of the ionic liquid used. However, it teaches that the miscibility of ionic liquids with organic liquids can be adjusted. (page 398) In other words, the amount of the ionic liquid is a Result-Effective variable. Therefore, it would have been obvious to one of

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ordinary skill in the art at the time of the invention was made to utilize the ionic liquid in whatever amount through routine experimentation in order to achieve a proper miscibility of the ionic liquid and organic liquid. Especially, Applicants do not show the criticality of the amount of ionic liquid. See MPEP 2144.05 (II).

10. Claims 10-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

None of the above references, taken alone or in combination, teaches or fairly suggests the use of the specific ionic liquid set forth in the instant claims.

11. Claims 17-18 would be allowable if rewritten to overcome the duplicate claim issue and/or claim objection, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

None of the above references, taken alone or in combination, teaches or fairly suggests the use of the specific ionic liquid set forth in the instant claims.

12. Regarding Applicants' request for interview, in view of the new references cited, Examiner believes that it is premature to have interview.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kuo-Liang Peng whose telephone number is (571) 272-1091. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached on (571) 272-1302. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

klp
March 11, 2005

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Kuo-Liang Peng
Primary Examiner
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